

allowability are acknowledged with appreciation.

Claims 1 and 2 have been amended into proper method claim format by beginning each limitation with a gerund.

Applicants also submit herewith an amendment to the specification wherein Appendix A amends the text of the specification and Appendix C amends the Abstract as suggested by the Examiner. Accordingly, Applicants respectfully request the Examiner to withdraw the objection to the text of the specification and Abstract.

No new matter within the meaning of § 132 has been introduced by any of the amendments.

Accordingly, Applicants respectfully request the Examiner to reconsider and allow all claims pending in this application.

**1. Rejection of Claims 1-2 and 16-35  
under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph**

The Office Action rejects claims 1-2 and 16-35 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Office Action states:

Where a claim sets forth a plurality of

elements or steps, each element or step of the claim should be separated by a line indentation. See 37 CFR § 1.75(i). See MPEP § 608.01(m). Claims 1 and 2 each contain multiple steps not separated by line indentations.

Claim 1 would be allowable if rewritten or amended to overcome the rejections(s) under 35 U.S.C. § 112, second paragraph, set forth in this Office Action.

Applicants respectfully traverse the rejection of claim 1 because the lack of indentations in a claim is not a proper basis for a statutory rejection under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph. The provision that claims contain indentations are all precatory in nature. The lack of indentations in a claim is also not a proper basis for an objection as to informalities.

In particular, 37 CFR § 1.75(i) states "Where a claim sets forth a plurality of elements or steps, each element or step of the claim **should** be separated by a line indentation". Nowhere does Rule § 1.75(i) require that the claim contain indentations.

The precatory nature of indentations can also be seen by the language of MPEP § 608.01(m), which states that "There **may** be plural indentations to further segregate subcombinations or related steps". Clearly, a statutory rejection of claim 1 under § 112, 2<sup>nd</sup> paragraph for failing to contain indentations is improper.

However, for the sole purpose of expediting prosecution,

Applicants have amended the claims to contain indentations at particular locations in claims 1 and 2. Accordingly, Applicants respectfully request the Examiner to reconsider and remove the rejections of claim 1 under § 112, 2<sup>nd</sup> paragraph.

The Office Action continues by rejecting claims 2 and 16-35 and stating:

Claims 2 and 16-35 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. § 112, second paragraph, set forth in this Office Action and **to include all of the limitations of the base claim and any intervening claims.** [*emphasis added*]

Applicants respectfully traverse the rejection of claim 2 and 16-35 because it is not understood what is meant by the Examiner.

Dependent claims 2 and 16-35 depend from claim 1 and thereby contain all the limitations of the independent claim 1. Therefore, there is no need to amend claims 2 and 16-35 to contain all the limitations of the base claim 1 or any intervening claims.

Accordingly, Applicants respectfully request the Examiner to reconsider and remove the rejection of claims 2 and 16-35 under § 112, 2<sup>nd</sup> paragraph.

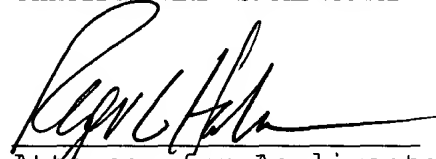
#### CONCLUSION

In light of the foregoing, Applicants submit that the

application is now in condition for allowance. The Examiner is therefore respectfully requested to reconsider and withdraw the rejection of the pending claims and allow the pending claims. Favorable action with an early allowance of the claims pending is earnestly solicited.

Respectfully submitted,

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A handwritten signature in dark ink, appearing to read 'Roger C. Hahn', is written over a horizontal line.

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Attorney's Docket No. SPO-594  
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: )  
)  
SEKINO; USHIODA; FUJINAMI; )  
IWAMOTO )  
)  
Serial No. 09/831,709 )  
)  
Filed: May 14, 2001 )

Group Art Unit: 1751  
Examiner: C. FIORILLA

RECEIVED  
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GROUP 1700

For: **METHOD OF PREPARING A CERAMIC ARTIFICIAL CROWN AND A  
PREPARATION KIT USED THEREFOR**

Appendix A

Please amend the following specification according to the proposed revision of 37 C.F.R. § 1.121 concerning a manner for making specification amendments.

Please replace the paragraph beginning at page 12, line 24, with the following rewritten paragraph:

--Fig. 2 is a sectional view of a typical mold used in the present invention. The mold is basically constituted by a an investment material 2, a backing member 3 and a ring 4 for casting, and forms therein a cavity constituted by a ceramic material-holding portion 5, a sprue portion 6 and a tooth-shaped portion 7. Here, the ceramic material-holding portion 5 is the one for holding the ceramic material that is a starting material of the core before it is pressurized and also serves as a cylinder when the pressure is to be given by using a plunger. The sprue portion 6 is the one

that serves as a sprue runner when the softened ceramic material is put into the tooth-shaped portion 7. The tooth-shaped portion is the one which imparts the final shape of the ceramic core when the ceramic material is put therein and is molded. The ring 4 is for holding the investment material 2 and is made of a cast iron or a stainless steel, and the backing member 3 works to compensate for the expansion of the investment material at the time of heating and is a cloth-like ceramic material.--

Please replace the paragraph beginning at page 13, line 19 with the following rewritten paragraph:

--Next, the method of fabricating the mold 1 will be described with reference to Fig. 3. First, a wax pattern 9 having the shape of the crown core is formed on a gypsum model of a tooth on which a ceramic crown which is an object article will be mounted (the shape of the wax pattern 9 corresponds to the shape of the tooth-shaped portion 7). Next, a sprue line 10 (usually made of wax, and the shape of the sprue line 10 corresponds to the shape of a sprue portion 6) is ~~stud~~ stuck on the wax pattern 9 and is installed on a pole member 112 (the shape of the pole member corresponds to the shape of the ceramic material-holding portion 5) of the crucible former 11. The crucible former 11 is the one in which the pole member 112 having a recessed fitting portion 113 at

the central portion in the upper surface thereof, is formed at the central portion of a cylinder 111 with bottom. The sprue line 10 connected to the wax pattern 9 is fitted to the recessed fitting portion 113, so that the wax pattern 9 is secured. From the standpoint of easy handling and easy moldability, it is desired that the crucible former 11 is the one in which the pole member 112 is tapered at 0.005 to 0.120 to possess a diameter that expands downward and, particularly, the one made of a synthetic rubber for easy removal as proposed already by the present inventors in Japanese Patent Application No. 73916/1999. Here, if two given points of the pole member 112 have heights denoted by h1 and h2 (heights from the upper surface of the bottom of the crucible former 11) and diameters at that heights are denoted by a1 and a2, then, the taper stands for a value defined by the following formula,

$$|(a1 - a2)/(h1 - h2)| \quad .$$



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For: **METHOD OF PREPARING A CERAMIC ARTIFICIAL CROWN AND A  
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**Appendix B**

Please amend the following claims according to the proposed revision of 37 C.F.R. §1.121 concerning a manner for making claim amendments.

1. (Currently Amended) A method of preparing a ceramic artificial crown comprising steps of:

molding a ceramic material heated and softened to a ceramic core by putting the ceramic material into a mold with the application of a pressure; by

applying at least one kind of dental porcelain selected from the group consisting of a body porcelain, an incisal porcelain and a translucent porcelain onto the surface of a the ceramic core ~~molded by heating and softening a ceramic material and putting it into a mold~~



~~with the application of a pressure followed by firing;~~  
~~wherein ; and~~

firing the dental porcelain; and wherein,

said mold for molding the ceramic material is formed by burning a wax pattern after having removed a crucible former from an assembly which comprises:

said crucible former having a pole member formed on the central portion of a cylinder with bottom, said pole member having a recessed fitting portion at a central portion in the upper surface thereof;

said wax pattern secured to said recessed fitting portion and applied with a solid lubricant on the surface thereof;

a ring with a backing layer that engages with said cylinder with bottom; and a

an investment material filled and cured between said ring and a tooth-shaped model; and wherein a portion  
~~corresponding to the pole member of the crucible former of said mold is filled with a ceramic material which is, then, pushed by a plunger to mold a ceramic core~~

the ceramic core is molded by filing the ceramic material to a portion, which corresponds to the pole

member, in the mold and then pushing the ceramic material  
by a plunger.

2. (Currently Amended) ~~A preparation method according to A~~  
method of preparing a ceramic artificial crown according to claim  
1, further including a step of coloring the surface by applying a  
surface-coloring material onto the surface of a fired article on  
which a porcelain is baked followed by firing, comprising the  
following steps:

coloring a surface of a fired article on which the dental  
porcelain is baked, by applying a surface-coloring material onto  
said surface and by firing, and a step of lustering by applying a  
glazing powder onto the surface of the fired article

lustering a colored surface obtained through the above  
step followed by firing, thereby to obtain a highly aesthetic fully  
ceramic artificial crown by applying a glazing powder onto the  
colored surface and by firing.

(Canceled) Claims 3-15

16. (Previously Added) The method according to claim 1  
further comprising applying the solid lubricant to the wax pattern

by applying a suspension comprising the solid lubricant, an organic binder and an organic solvent, followed by drying.

17. (Previously Added) The method according to claim 2 further comprising applying the solid lubricant to the wax pattern by applying a suspension comprising the solid lubricant, an organic binder and an organic solvent, followed by drying.

18. (Previously Added) The method according to claim 16 wherein said suspension comprises from 0.1 to 30% by weight of the solid lubricant, from 0.1 to 20% by weight of the organic binder and the remainder of the organic solvent.

19. (Previously Added) The method according to claim 17 wherein said suspension comprises from 0.1 to 30% by weight of the solid lubricant, from 0.1 to 20% by weight of the organic binder and the remainder of the organic solvent.

20. (Previously Added) The preparation method according to claim 1 wherein the ceramic material put into the mold has a viscosity of from  $10^2$  to  $10^9$  poises.

21. (Previously Added) The preparation method according to claim 19 wherein the ceramic material put into the mold has a viscosity of from  $10^2$  to  $10^9$  poises.

22. (Previously Added) The preparation method according to claim 1 wherein the ceramic material is a crystalline  $\text{MgO-CaO-SiO}_2$  glass material.

23. (Previously Added) The preparation method according to claim 20 wherein the ceramic material is a crystalline  $\text{MgO-CaO-SiO}_2$  glass material.

24. (Previously Added) The preparation method according to claim 21 wherein the ceramic material is a crystalline  $\text{MgO-CaO-SiO}_2$  glass material.

25. (Previously Added) The preparation method according to claim 1 further comprising providing the pole member of the crucible former with a diameter which widens downward and is tapered at 0.005 to 0.120.

26. (Previously Added) The preparation method according to claim 24 further comprising providing the pole member of the

crucible former with a diameter which widens downward and is tapered at 0.005 to 0.120.

27. (Previously Added) The preparation method according to claim 1 further comprising providing said plunger made of a ceramic material having a melting point or decomposition temperature, whichever is lower, which is higher than a temperature of forming the ceramic artificial crown and having a thermal conductivity of not smaller than  $0.1(\text{cal}\cdot\text{cm}^{-1}\cdot\text{sec}^{-1}\cdot^{\circ}\text{C}^{-1})$  or a coefficient of linear expansion of not larger than  $4.0 \times 10^{-6}(^{\circ}\text{C}^{-1})$ .

28. (Previously Added) The preparation method according to claim 26 further comprising providing said plunger made of a ceramic material having a melting point or decomposition temperature, whichever is lower, which is higher than a temperature of forming the ceramic artificial crown and having a thermal conductivity of not smaller than  $0.1(\text{cal}\cdot\text{cm}^{-1}\cdot\text{sec}^{-1}\cdot^{\circ}\text{C}^{-1})$  or a coefficient of linear expansion of not larger than  $4.0 \times 10^{-6}(^{\circ}\text{C}^{-1})$ .

29. (Previously Added) The preparation method according to claim 1 further comprising adhering a solid lubricant in advance onto the surface of the plunger that comes into contact with the ceramic material.

30. (Previously Added) The preparation method according to claim 28 further comprising adhering a solid lubricant in advance onto the surface of the plunger that comes into contact with the ceramic material.

31. (Previously Added) The preparation method according to claim 1 further comprising applying a dental porcelain onto the surface of the ceramic core, followed by baking, wherein the dental porcelain applied is a kneaded product obtained by kneading with water a body porcelain, an incisal porcelain or a translucent porcelain which comprises:

100 parts by weight of a glass material containing, on the basis of the oxides, 57 to 65% by weight of  $\text{SiO}_2$ , 8 to 18% by weight of  $\text{Al}_2\text{O}_3$ , 15 to 25% by weight of  $\text{B}_2\text{O}_3$ , 0.1 to 2% by weight of  $\text{ZnO}$ , 3 to 7% by weight of  $\text{Na}_2\text{O}$  and 2 to 8% by weight of  $\text{Li}_2\text{O}$ ; and

0.1 to 10 parts by weight of an inorganic crystalline powder having a refractive index which is different from the refractive index of the glass material by 0.01 to 0.1, and having an average particle diameter of from 0.1 to 10  $\mu\text{m}$ .

32. (Previously Added) The preparation method according to claim 30 further comprising applying a dental porcelain onto the

surface of the ceramic core, followed by baking, wherein the dental porcelain applied is a kneaded product obtained by kneading with water a body porcelain, an incisal porcelain or a translucent porcelain which comprises:

100 parts by weight of a glass material containing, on the basis of the oxides, 57 to 65% by weight of  $\text{SiO}_2$ , 8 to 18% by weight of  $\text{Al}_2\text{O}_3$ , 15 to 25% by weight of  $\text{B}_2\text{O}_3$ , 0.1 to 2% by weight of  $\text{ZnO}$ , 3 to 7% by weight of  $\text{Na}_2\text{O}$  and 2 to 8% by weight of  $\text{Li}_2\text{O}$ ; and

0.1 to 10 parts by weight of an inorganic crystalline powder having a refractive index which is different from the refractive index of the glass material by 0.01 to 0.1, and having an average particle diameter of from 0.1 to 10  $\mu\text{m}$ .

33. (Previously Added) The preparation method according to claim 1 further comprising coloring and lustering the surface of said crown by applying a kneaded product to the surface of the fired article, followed by firing, wherein the kneaded product is obtained by kneading a staining powder and a glazing powder, each comprising, as a chief sintering component, a glass material containing, on the basis of oxides, 57 to 65% by weight of  $\text{SiO}_2$ , 8 to 18% by weight of  $\text{Al}_2\text{O}_3$ , 15 to 25% by weight of  $\text{B}_2\text{O}_3$ , 0.1 to 2% by weight of  $\text{ZnO}$ , 3 to 7% by weight of  $\text{Na}_2\text{O}$  and 2 to 8% by weight of

Li<sub>2</sub>O with a kneading solution containing not less than 5% by weight of an ester compound having a boiling point of from 100 to 250°C.

34. (Previously Added) The preparation method according to claim 32 further comprising coloring and lustering the surface of said crown by applying a kneaded product to the surface of the fired article, followed by firing, wherein the kneaded product is obtained by kneading a staining powder and a glazing powder, each comprising, as a chief sintering component, a glass material containing, on the basis of oxides, 57 to 65% by weight of SiO<sub>2</sub>, 8 to 18% by weight of Al<sub>2</sub>O<sub>3</sub>, 15 to 25% by weight of B<sub>2</sub>O<sub>3</sub>, 0.1 to 2% by weight of ZnO, 3 to 7% by weight of Na<sub>2</sub>O and 2 to 8% by weight of Li<sub>2</sub>O with a kneading solution containing not less than 5% by weight of an ester compound having a boiling point of from 100 to 250°C.

35. (Previously Added) The preparation method according to claim 31 further comprising coloring and lustering the surface of said crown by applying a kneaded product to the surface of the fired article, followed by firing, wherein the kneaded product is obtained by kneading a staining powder and a glazing powder, each comprising, as a chief sintering component, a glass material containing, on the basis of oxides, 57 to 65% by weight of SiO<sub>2</sub>, 8 to 18% by weight of Al<sub>2</sub>O<sub>3</sub>, 15 to 25% by weight of B<sub>2</sub>O<sub>3</sub>, 0.1 to 2% by



weight of ZnO, 3 to 7% by weight of Na<sub>2</sub>O and 2 to 8% by weight of Li<sub>2</sub>O with a kneading solution containing not less than 5% by weight of an ester compound having a boiling point of from 100 to 250°C.



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IWAMOTO ) Examiner: C. FIORILLA  
Serial No. 09/831,709 )  
Filed: May 14, 2001 )

For: **METHOD OF PREPARING A CERAMIC ARTIFICIAL CROWN AND A  
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Appendix C

Please amend the Abstract of the Disclosure according to the proposed revision of 37 C.F.R. §1.121 concerning a manner for making amendments.

Abstract

A method of preparing a ceramic artificial crown by applying at least one kind of dental porcelain ~~selected from the group consisting of a body porcelain, an incisal porcelain and a translucent porcelain~~ onto the surface of a ceramic core molded by heating and softening a ceramic material and putting it into a mold with the application of a pressure followed by firing; wherein

said mold is the one formed by burning a wax pattern after having removed a crucible former from an assembly which ~~comprises:~~

~~said crucible former having a pole member formed on the central portion of a cylinder with bottom, said pole member~~

~~having a recessed fitting portion at a central portion in the upper surface thereof;~~

~~said wax pattern secured to said recessed fitting portion and applied with a solid lubricant on the surface thereof;~~

~~a ring with a backing layer that engages with said cylinder with bottom; and~~

~~a investment material filled and cured between said ring and a tooth model; and wherein~~

~~a portion corresponding to the pole member of the crucible former of said mold is filled with a ceramic material which is, then, pushed by a plunger to mold a ceramic core.~~

~~This method makes it possible to efficiently prepare a fully ceramic artificial crown of a high quality in a short period of time.~~